STATE OF NEW MEXICO
Land of Enchantment

PERIODIC REVIEW REPORT ON PROGRESS TOWARD THE NATIONAL VISIBILITY GOAL

Presented to the
U. S. Environmental Protection Agency
Region VI
Dallas, Texas

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II. Definitions and Acronyms

Definitions

Best Available Retrofit Technology – (BART) air pollution control technology that is determined to be appropriate for retrofitting onto existing sources which are identified as contributors to visibility impairment.

CIRA – Cooperative Institute for Research in the Atmosphere

Class I Area – see Mandatory federal Class I area.

Deciview (dv)– a measurement of visibility impairment. A haze index derived from calculated light extinction (loss of light due to scattering or absorption) such that uniform changes in haziness correspond to uniform incremental changes in perception across the entire range of conditions, from pristine to highly impaired. 100 miles is equivalent to 9 deciviews and 150 miles is equivalent to about 5 deciviews.

Deciview (dv)

0	7	11	14	18	23	30	34	39	46
250	124	81	62	40	25	12.4	8	5	2.5

Visual Range (miles)

Federal Class I area – any federal land that is classified or reclassified "Class I" according to EPA's PSD regulations (40 CFR 52.21)

Federal Implementation Plan – an implementation plan developed by the federal government.

Integral vista – a view from within a Class I area of a specific landmark or panorama located outside the boundary of the Class I Area.

Light extinction – the loss of light due to scattering and absorption by air pollutants.

Long term strategy – a 10-15 year plan for making progress toward the national visibility goal.

Mandatory federal Class I area – international parks in existence as of August 7, 1977, national wilderness areas and memorial parks greater in size than 5000 acres, and national parks greater in size than 6000 acres.

Nephelometer – a device which estimates the atmospheric scattering coefficient by directly measuring light scattered by aerosols and gasses in a volume of sampled air.

Regional haze – visibility impairment that is produced by a multitude of sources and activities which emit fine particles and their precursors (sulfates, nitrates, organic carbon, elemental carbon, soil dust and particulates) and which are located across a broad geographic area.

Reasonably attributable visibility impairment – impairment that is cause by the emission of air pollutants from one or a small number of sources.

Significant visibility impairment – impairment which interferes with the management, protection, preservation, or enjoyment of the visitor's visual experience of a Class I area.

State Implementation Plan – a plan of regulations developed and used by a state, and submitted to the U.S. EPA for approval, to demonstrate that the state has the resources and legal authority to carry out the provisions of the federal clean air act.

Standard Visual Range (SVR) - the distance (Km or miles) over which a dark object can just be seen and recognized against a sky background or horizon. A distance of 391 Km (243 miles) is considered a pristine condition.

Transmissometer – a device which measures the light extinction coefficient by measuring the attenuation of light from a source over distance.

Tribal Implementation Plant – similar to a SIP, but developed by Tribal agencies who will administer air programs on tribal lands.

Visibility impairment – any humanly perceptible change in visibility from that which would have existed under natural conditions.

Acronyms

AQB	-	Air Quality Bureau
AQRV	-	Air Quality Related Value
BART	-	Best Available Retrofit Technology
CAA	-	Clean Air Act
CFR	-	Code of Federal Regulations
CIRA	-	Cooperative Institute for Research in the Atmosphere
DOA	-	Department of Agriculture
DOI	-	Department of the Interior
EIB	-	Environmental Improvement Board (New Mexico)
FIP	-	federal implementation plan
FLM	-	Federal Land Manager
GCVTC	-	Grand Canyon Visibility Transport Commission
IMPROVE	-	Integrated Monitoring of Protected Visual Environments
Km	-	kilometer (one kilometer equals 0.62137 miles or 3280 feet)
MOU	-	memorandum of understanding
NMED	-	New Mexico Environment Department

NPS	-	National Park Service (U.S.)
NSR	-	New Source Review
PSD	-	Prevention of Significant Deterioration
SIP	-	state implementation plan
TIP	-	Tribal implementation plan
USEPA	-	United States Environmental Protection Agency
USFS	-	United States Forest Service
USFWS	-	United States Fish and Wildlife Service
WGA	-	Western Governors Association
AQI	-	Air Quality Initiative
WESTAR-	Western States Air Resources Council	
WRAP	-	Western Regional Air Partnership

III. INTRODUCTION

Blue skies and scenic vistas in New Mexico are considered some of the most beautiful in the United States and are one of the major attractions of tourists to the State. Although a person's eye only observes what the mind, heart, and imagination are gifted to see, aesthetic appreciation of scenery can be limited by physical interference of light transmission due to pollutants in the air.

Visibility is a good indicator of air quality. It is the term used to characterize the physical limitations in the atmosphere affecting our ability to see clearly. An object is visible to the eye because it contrasts with its background. This apparent contrast decreases as distance from the object increases. Natural visibility limitations result from blue light scattering due to air molecules and also due to the scattering and absorption of light by suspended natural aerosols.

Polluted atmospheres can also impair or reduce visibility to a greater degree depending upon type, concentration, and size of suspended anthropogenic (caused or produced by humans) aerosol pollutants. Particles and gases released into the atmosphere either scatter or absorb light. The scattering and absorption of light reduce the amount of light a person receives from a viewed object and will diminish resolution and contrast. The effects are degradation of color, flattening or blurring of textures, and blocking of landscapes, resulting in the reduction or loss of aesthetic value. This impairment can occur hundreds and even thousands of miles from the source(s) of the pollution and can occur across state and international borders.

Generally two types of air pollution reduce visibility:

1. smoke, dust, colored gas plumes, or layered haze, emitted from stacks which obscure the sky or horizon and are relatable to a single source or a small group of sources, and

2. widespread regional haze from many types of sources and activities which impair visibility in every direction over a large area (uniform haze).

The range of visibility in the western United States can be as far as 140 miles without pollution impairment and can be as much as 90 miles in the east. Higher relative humidity in the eastern U.S. contributes to reduced visibility because of its reaction with pollutants in the atmosphere. Current estimates of visibility in the west range from 33 to 90 miles and between 14 and 24 miles in the east. Contributors to these problems are electric utility power plants, copper smelters, manufacturing, fossil fuel combustion (coal, oil, natural gas), automobile exhaust, urban area activities, agricultural activities, prescribed fires and wild forest fires, and naturally occurring wind blown dust. The primary forms of pollution that reduce visibility are sulfates and nitrates (fossil fuel combustion), organic hydrocarbons, elemental carbon (soot), and dust.

EPA's first visibility regulation in 1980 (Phase I) was aimed at identifying a single source or small group of sources that impaired visibility in mandatory federal Class I areas. The most recent rule on regional haze (July 1, 1999 - Phase II) is intended to deal with impairment over large geographic areas that impact the Class I areas. As a result of these regulations, which establish a national visibility goal, it is expected that visibility in general throughout the United States will improve.

Because visibility impairment can cover large areas, and can affect areas across state boundaries, EPA has authorized states to work together to develop strategies that will improve visibility.

The objective of the regional haze regulation is to achieve natural background visibility within sixty (60) years. The length of time from Congress requiring regulations to deal with visibility (1977), until the time that visibility is required to be restored to natural levels by 2064, will be almost 90 years. This visibility strategy is a very long-range goal and to ensure that progress is made toward achieving this goal, milestones for accomplishing certain actions have been built into the regulations. The rule requires states to submit plans (SIPs) to the EPA for approval with updates and revisions at specified times. The plans must show the state's strategy for meeting the visibility goals. These timelines are shown in Appendix B.

This 2000 Periodic Visibility Report is required by EPA's regulations to summarize New Mexico's progress toward achieving the national visibility goal. It included consultation with the appropriate Department of the Interior (DOI) and Department of Agriculture (DOA) Federal Land Managers (FLMs) of all mandatory Class I federal areas in New Mexico. Their comments regarding this report are contained in Section IX and Appendix C. This report is being submitted to the U.S. EPA Region VI office in Dallas, Texas, and is also being made available to the public.

This is the fourth periodic report. The first was written in June of 1991, the second in August of 1994, and the third in November 1997. Copies of each are in Appendix D.

IV. Class I Areas

Mandatory federal Class I areas are those designated as areas of special national or regional value from the natural, scenic, recreational, or historic perspective. Congress set aside certain international parks, national wilderness areas, national memorial parks, and national parks to preserve and enhance their beauty for present and future generations to enjoy. These include well known areas such as the Grand Canyon, Yosemite, Mt. Rainier, Great Smoky Mountains, Yellowstone, and the Everglades.

There are 156 Class I areas in the United States in 36 states (see map in Appendix A). Nine of these Class I areas are in New Mexico (see map in Appendix A).

New Mexico's Class I areas are managed by either the Forest Service, the National Park Service, or the Fish and Wildlife Service. The Class I areas in New Mexico, and the federal agency responsible for managing the area are:

Department of Agriculture – Forest Service
- Gila Wilderness Area
- Pecos Wilderness Area
- San Pedro Parks Wilderness Area
- Wheeler Peak Wilderness Area
- White Mountain Wilderness Area

Department of the Interior – National Park Service
Bandelier Wilderness Area
Carlsbad Caverns National Park

Department of Interior – Fish and Wildlife Service
Bosque del Apache Wilderness Area
Salt Creek Wilderness Area

A description and short history of the Pecos, San Pedro Parks, and Wheeler Peak can be found in Appendix A. A brief description of the Gila and White Mountain is also included.

V. Federal Legislation

In 1977, the U.S. Congress amended the 1970 Federal Clean Air Act (CAA) to protect visibility in Class I areas throughout the country, including New Mexico. These amendments to the CAA included Part C - Prevention of Significant Deterioration (PSD) of Air Quality. This air quality amendment was to use air quality permitting to help preserve the quality of air in areas where air is cleaner than the National Ambient Air Quality Standards. Subpart 2 of Part C contains Section 169A – Visibility Protection for Mandatory Federal Class I areas. In this section, Congress declared as a national visibility goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory federal Class I areas resulting from manmade air pollution.

In compliance with the requirements of this section, the U.S. Environmental Protection Agency (EPA) promulgated a list of Class I federal areas where visibility is an important value. These 156 federal Class I areas were listed by state in the Friday, November 30, 1979 issue of the Federal Register.

On December 2, 1980, the EPA promulgated the first phase (Phase I) of the visibility protection regulations (40 CFR 51, Subpart P - Protection of Visibility, Sections 51.300 through 51.307) to establish long range goals, a planning process, and implementation procedures for the 36 states containing mandatory federal Class I areas. This rule dealt with visibility impairment from individual or small groups of sources that could be identified. It did not deal with regional haze from a combination of sources. Final regional haze rules (Phase II) would be developed later as science and technology improved. In 1993 the National Academy of Science concluded that the science and technology did exist to justify regulations to improve visibility due to regional haze. The final rule would include Sections 308 and 309 of Subpart P. A summary sheet of the requirements of Phase I and Phase II of the regulation is in Appendix B.

The Grand Canyon Visibility Transport Commission (GCVTC) was created by Congress in 1991 to study scientific and technical information on visibility protection for 16 Class I areas on the Colorado Plateau which basically covers the central Rocky Mountain Region. This included the San Pedro Parks Wilderness in New Mexico. In 1996, the GCVTC submitted a report to the U.S. EPA with recommendations on how to protect visibility (Appendix B). The final rule on regional haze, issued by the EPA on July 1, 1999, is based on the report submitted by the GCVTC. This final rule also allows for those western states that were a part of the GCVTC to work together to develop a

regional strategy for those Class I areas in the region.

Under this final regional haze rule (Phase II), states are required to submit to the EPA their control strategy plans (SIPs) for controlling regional haze. A timeline and history of visibility rule development and requirements are shown in Appendix B. The requirements of the regional haze rule apply to all states and all 156 Class I areas, not just the initial 16 identified on the Colorado Plateau. A summary sheet for the requirements of Phase II is in Appendix B. Since regional haze covers large geographic areas, one of the additional benefits to improving visibility in the 156 Class I areas in the United States is that visibility can improve in areas outside of the Class I area that were not originally targeted for visibility improvement.

EPA's final rule allows states to work together and develop joint strategies to achieve the national visibility goal or to develop a strategy independently for EPA approval. New Mexico participated in the GCVTC study and currently continues to participate in a multi-state working group called the Western Regional Air Partnership (WRAP). The WRAP is the follow-up group to the GCVTC. This group consists of state governments, tribal governments, and federal agencies. The makeup of the group changes, but based on the WRAP organization's web page the group currently includes Arizona, California, Colorado, Idaho, Montana, New Mexico, North Dakota, South Dakota, Oregon, Utah, Washington, and Wyoming. Nevada and Hawaii have not joined. Alaska intends to join. Nine Tribal governments participate and three federal agencies; the U.S. Environmental Protection Agency, U.S. Department of Agriculture, and the U.S. Department of the Interior. Two more Tribal governments are expected to join.

The WRAP is tasked with implementing the recommendations of the GCVTC. What the outcome from this group will be is unknown. New Mexico will need to decide in the near future whether to pursue the national visibility goals as a member of this working group or independently outside of the group. As a member of the WRAP regional planning effort, New Mexico can submit a control strategy plan to the EPA under Section 309 by the end of 2003. If New Mexico does not participate under the Section 309 regional planning efforts, a plan is required to be submitted under Section 308 by 2008, with a strategy that projects ahead for 60 years. There are similar working groups for other regions of the country. To follow developments of the WRAP and New Mexico's progress toward achieving this goal, visit the WRAP and NMED web sites shown in Appendix A.

VI. State Level Action and Participation

States were required to submit revisions to their State Implementation Plans (SIPs) that would meet requirements of Phase I of the federal program for protection of visibility within nine (9) months of EPA's promulgation of the visibility protection regulations. The pollutants of primary concern under Phase I are particulate matter and nitrogen oxides (NOx). Sulfur dioxide (SO2) and sulfates are primary contributors to regional haze, but usually were not a part of Phase I. These pollutants would become part of EPA's final regional haze rule (Phase II).

By December 1982, only Alaska had submitted a SIP revision for Phase I visibility protection to EPA. Consequently, the Environmental Defense Fund (EDF) filed a citizen suit alleging EPA had failed to perform its duty by not promulgating visibility Federal Implementation Plans (FIPs) for the states

when the states did not submit approvable SIPs to EPA. The EPA and the EDF came to a settlement agreement requiring EPA to promulgate proposed SIPs for states in a two part process (Phase I, Part I and Phase I, Part II). These regulations would become final rules for states not filing approvable SIP revisions prior to federal promulgation. Phase I, Part I would be proposed regulations covering air quality review of new sources, monitoring requirements, and pertinent definitions. Phase I, Part II, would address the remaining parts of the visibility protection plan concerning long-term strategies and integral vistas.

On May 9, 1986, the New Mexico Environmental Improvement Board (EIB) did adopt the regulatory amendments proposed by the New Mexico Air Quality Bureau (AQB) to satisfy the Phase I, Part I requirements for new source review (PSD) and monitoring. This visibility SIP revision was submitted to EPA in August 1986; however, it was late. In accordance with the agreement with the EDF, the EPA published 40 CFR 52.1636, Visibility Protection. This states that the requirements of Section 169A of the CAA are not met for New Mexico. Disapproval was not due to the content of the plan, but because the submittal was late. Therefore, the EPA incorporated the requirements of these sections into New Mexico's SIP by reference.

Although not yet formally approved by EPA, the visibility requirements in the SIP revision have been implemented at the State level since adoption by the EIB, and conforms to EPA guidance. These included amendments to the new source review (NSR) regulation, Title 20, Chapter 2, Part 72 (20.2.72 NMAC – Construction Permits) and Prevention of Significant Deterioration (2.20.74 NMAC - PSD).

Regarding the Phase I, Part II requirements, on November 24, 1987, EPA promulgated FIPs for many states including New Mexico. Since that date, the Part II provisions regarding general visibility plan requirements and long-term strategies have been implemented by New Mexico's adopted SIP. This FIP can be found in 40 CFR, Part 52, Section 52.29. On August 14, 1992, the New Mexico EIB adopted the SIP revision proposed by the AQB to meet all of the applicable federal requirements for a Phase I, Part II visibility protection plan. This visibility SIP revision was submitted to EPA in September 1992. This submittal also has not yet been approved by the EPA.

One feature of the Phase I requirements outlined in the 40 CFR 51, Section 51.306 is a periodic review of the long-term strategy (10-15 years) and a report on progress toward the national visibility goal. This requirement is outlined at 40 CFR Section 51.306(c).

The objective of this report is to make available to the EPA and the public an assessment of New Mexico's progress toward the national visibility goal. This report has been prepared in a format addressing each area listed in 40 CFR 51, Section 51.306(c).

Since the 1997 Visibility Report New Mexico;

1. continues to participate in the WRAP and with WESTAR in regional haze strategies,
2. has participated in the development of the ANNEX report submitted to EPA by the WRAP in October 2000 as required by Section 309 of the rule,
3. helped develop two SIP submittal templates that states can use as guidance in preparing

their SIP submittals under the new Section 308 and 309, and
4. has hosted two multi-state conferences related to the regional haze rule requirements.

For current developments on New Mexico's progress on meeting the visibility goals contact:

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VII. Visibility Monitoring Network

Visibility is commonly measured using three techniques:

1. a **transmissometer** measures the light extinction coefficient by measuring the attenuation of light from a source over a distance;

2. a **nephelometer** estimates the atmospheric scattering coefficient by directly measuring light scattered by aerosols and gasses in a sampled air volume;

3. **pictures** from a 35 MM or 8 MM camera which are used to compare vistas under different meteorological and seasonal conditions.

A relatively new network of monitors, referred to as the IMPROVE (Integrated Monitoring of Protected Visual Environments) network, is becoming more widespread with time in all of the Class I areas.

The network began development in 1988 and has expanded from 30 sites to over 100 throughout the Class I areas. Data collected from this network has been used, and will continue to be used, to determine adverse impacts on visibility and ultimately to determine improvements in visibility as the national visibility goal is achieved. For more information on the IMPROVE monitoring network, see Appendix A.

An IMPROVE monitor has been in the Salt Creek Wilderness since April 8, 2000, and in the Bosque del Apache since April 15, 2000. An IMPROVE monitor has been at Wheeler Peak since August 16, 2000. The Pecos Wilderness visibility is also represented by the monitor at Wheeler Peak. San Pedro Parks has had an IMPROVE monitor since August 16, 2000. Other than 1997, no visibility information exists for the White Mountain Wilderness. An IMPROVE nephelometer is planned to be installed in the fall of 2001. Bandelier has had an IMPROVE monitor since March of 1988 and the Gila since April 1994.

A monitor was installed in Carlsbad Caverns National Park in 1986 and it was discontinued in 1988. Carlsbad Caverns is now represented by a National Park Service monitor located at the Guadalupe Mountains National Park in Texas, just south of Carlsbad Caverns National Park.

VIII. Code of Federal Regulations, (CFR) Title 40, Part 51

40 CFR § 51.306(c)(1): The progress achieved in remedying existing impairment of visibility in any mandatory Class I federal area.

At the time the EIB heard the proposed revisions to New Mexico's SIP for compliance with the Phase I requirements of the federal visibility protection plan, the FLMs were requested to provide information on existing impairment of visibility in their Class I areas.

Previous Visibility Reports have stated that comments received from the FLMs indicated no existing attributable impairment of visibility in their respective Class I areas as defined under Phase I of the visibility protection plan.

According to EPA guidance contained in the December 2, 1980 Federal Register preamble to 40 CFR Part 51, Subpart P, Phase I of the program requires control of impairment that can be traced to a single existing stationary facility or small group of existing stationary facilities. This type of impairment is generally categorized as smoke, dust, colored gas plumes or plume blight and layered hazes.

Widespread, regionally homogeneous haze arising from a multitude of sources and impacting large areas is not controlled under Phase I and is left to Phase II enacted July 1, 1999.

In 1986, the FLMs qualified their determination of no existing impairment of Class I areas in New Mexico by saying they lacked sufficient quantitative data and technical analysis to determine the origin of suspected impairment.

In August of 1992, the EIB heard the proposed revisions to New Mexico's SIP for compliance with additional Phase I requirements of the federal visibility protection plan and the FLMs were requested to provide information on existing impairment of visibility in their Class I areas. The comments received from the FLMs indicated no existing attributable impairment of visibility in their respective Class I areas. The comments received at that time were consistent with those received in consultation with the FLMs for the development of both this and previous periodic review reports which is concern over observed, but non-attributed, impacts to visibility resulting in regional haze.

In response to this report (letter dated August 8, 2001, Appendix C, Figure 2) the FWS and NPS reiterate that since 1985 they have consistently held the position that all NPS- and FSW-administered Class I and Class II areas in the continental United States are affected by a visibility-degrading uniform haze.

40 CFR § 51.306(c)(2): The ability of the long-term strategy to prevent future impairment of visibility in any mandatory Class I federal area.

The EPA, in compliance with the court approved settlement arrived at with the EDF on April 20, 1984, was to promulgate regulations for states not filing approvable SIP revisions. The November

24, 1987, EPA promulgation of regulations was intended to satisfy the agreement. At that time, EPA determined that since visibility impairment attributable to specific sources could not be identified in most states, including New Mexico, it was not necessary to include BART control strategies on existing sources in the federal Implementation Plans (FIPs).

Consequently, apart from a reiteration of the guideline requirements for long-term strategy development promulgated in the December 2, 1980, final rulemaking under 40 CFR Section 51.306, the EPA contends that its ongoing efforts to implement the visibility New Source Review (NSR) and Prevention of Significant Deterioration (PSD) programs meet the long-term strategy requirements for preventing future impairments from major stationary sources or major modifications. The future impairments considered were only those typical of existing Phase I regulated impairment. Adopted regulatory amendments to the State PSD and NSR programs are considered equal to EPA's programs.

Regional haze is a type of air pollution that is widespread and uniformly reduces visual range in all directions (if you are standing in it). It arises from a multitude of sources and generally consists of suspended fine particles of sulfate and carbon. In the Southwest, the primary regional sources of these pollutants are coal-fired power plants, copper smelters, rural fugitive dust, automobile emissions, forest fires, and urban and metropolitan areas. Regional haze was not regulated by EPA under Phase I of the federal program. Due to the provisions of the New Mexico Air Quality Control Act (NMSA 74-2-5.B.(1)), the State is required to develop visibility regulations which cannot be more stringent than those required by the federal act and federal regulations. Until July 1999**,** Phase I was the only visibility impairment regulation in New Mexico.

In August of 1992, the Board adopted the proposed revisions to New Mexico's SIP for compliance with the Phase I, Part II requirements of the federal visibility protection plan. Since visibility impairment attributable to specific sources has not been identified in New Mexico, the current permitting programs of the New Mexico Environment Department (NMED) Air Quality Bureau (AQB) are considered by the State to meet the long-term strategy requirements for preventing future impairment from major stationary sources or major modifications. These include the requirements of the New Source Review (NSR) and Prevention of Significant Deterioration (PSD) programs. Visibility modeling for PSD sources applying for permits to locate within 100 kilometers of a Class I area is required before PSD permits are issued. PSD permits are required to include enforceable emission limits and permit conditions to ensure that the source properly operates and maintains its control equipment and that visibility impairments to Class I areas will not occur.

The AQB is presently a part of a cooperative effort with land management agencies throughout the State to develop a better understanding of smoke management needs in the State. In April of 1997 the AQB entered into a memorandum of understanding (MOU) with the FLMs and other land management agencies that conduct prescribed burns on public lands in the State (Appendix C). The MOU calls for cooperative planning and coordination of burning activities among the signatories as well as actual fire activity reports and emissions inventory data submissions to the AQB on an annual basis. The MOU is consistent with New Mexico’s visibility goals and ensures compliance with state and federal particulate matter (PM) standards. The MOU specifies permitting procedures for prescribed burns different from other procedures the AQB uses to regulate open burning. Although

prescribed burning activities contribute to regional haze, they are presently regulated by the AQB to ensure ambient air quality standards are met and because EPA specifically required the State to consider them in developing its long range visibility protection strategy. Smoke from prescribed fires near or inside Class I areas can be reasonably attributed by visual observation or simple dispersion modeling to specific prescribed burns.

The current MOU is scheduled to expire December 31, 2002. It is unlikely that another MOU will replace it. It is likely that the AQB will replace the MOU with air quality regulations that would be more effective and enforceable. The provisions of the MOU are not legally binding and are only achieved through mutual agreement.

The AQB's involvement in the former Grand Canyon Visibility Transport Commission (GCVTC), and subsequent involvement in its successor organization - the Western Regional Air Partnership (WRAP), may result in regulatory activities aimed at preventing long range impacts to visibility as technological capabilities for monitoring and reasonable attribution of source apportionment of regional haze become available.

40 CFR § 51.306(c)(3): Any change in visibility since the last such report, or, in the case of the first report, since plan approval.

This is New Mexico's fourth report since federal promulgation of the visibility long-term strategy. The first was made available to the public in June 1991, the second in August 1994, the third in November 1997. During the consultation process with the appropriate FLMs, the State requested that the FLMs support their comments and recommendations for this report with summaries or analyses of available visibility and relevant particulate matter monitoring data for each mandatory Class I federal area.

Over the years, the FLMs for the Class I areas have expanded and improved on the visibility monitoring network. Air Resource Specialist, Inc. is under contract by the federal government to install, maintain and collect visibility data from this network. The data yielded from the continuous visibility monitoring of DOI and DOA Class I areas is derived from measurements made with transmissometers, nephelometers, and photographs. See IMPROVE monitoring network in Appendix A.

Monitoring at Bandelier has been done with a transmissometer since 1986. All other sites had used photographic techniques. Transmissometers measure light extinction (the sum of light scattering and absorption) over a specified path length. Essentially, a transmissometer is a telescope fitted with a detector that reads the amount of light received from a light source of known radiance. Transmissometers can be highly accurate at distances of up to twenty miles. Transmissometer measurements made by qualified personnel are highly reliable. The potential problem associated with them is that layered hazes or plume blight may not interfere with light transmission along the specified sight path while still impacting the visibility within the Class I area. Photographic monitoring methods can compensate for this shortcoming associated with transmissometers because they involve qualitative visibility analyses over a wider geographical area.

For photographic visibility monitoring, color slides can be taken with 8 MM or 35 MM cameras and sky/target contrast measurements can be made through slide densitometry techniques. From these quantitative measurements of contrast, the light extinction coefficient is determined. The derivations are calculated with many assumed factors and are therefore only good approximations in comparison to measured extinction obtained via transmissometer. The qualitative interpretation gained through slide analysis and the relatively lower cost of data gathering makes photographic monitoring a good alternative. Cameras are becoming less common as the IMPROVE network expands.

From measurements of light extinction, Standard Visual Range (SVR) is determined. SVR is generally thought of as the distance (Km or miles) over which a dark object can just be seen and recognized against a sky background or horizon. Median cumulative frequency SVR is the SVR that is better than half the days of the period monitored and worse than half the days for the same period. The median SVR (50th percentile) was used in the 1997 report to maintain continuity with the 1991 and 1994 reports and to provide an indication of what visibility conditions are like most often. The DOA FLM have stated in the past that the 90th percentile SVR is more appropriate for determining modeling impacts to visibility as an Air Quality Related Value. This type of visibility modeling is required as part of prevention of significant deterioration analysis for new or modified polluting facilities near Class I areas. While the 90th percentile gives an indication of the percentage of very clear days, it will not indicate the most likely condition to be encountered on any given day.

Two of the four Class I areas within New Mexico under the jurisdiction of the DOI have been monitored for visibility impacts. These are the wilderness portion of Bandelier National Monument and Carlsbad Caverns National Park. The seasonally representative annual and seasonal median cumulative frequency standard visual ranges for the years of extant and sufficient photographic and transmissometer data are illustrated graphically for both sites in Appendix A. Visibility monitoring was discontinued at the Carlsbad Caverns site in 1988. The other two Class I areas within New Mexico under DOI jurisdiction are those administered by the Department of Fish and Wildlife Service (Bosque del Apache and Salt Creek Wildernesses). Neither of these sites had been monitored for visibility impacts until April 2000.

The median cumulative frequency SVR data shown in Appendix A characterize the visibility at both sites, but are not extensive enough at the Carlsbad Caverns site to reliably indicate trends in visibility. The apparent worsening of visibility at Bandelier after 1984 may be due to a change in the method of data collection from photographic methods to transmissometers in 1986. Adverse impacts on visibility as recognized under Phase I of the Visibility Protection Plan are not indicated.

Of the five DOA areas, four have been monitored for visibility impacts by the Forest Service including the Gila, Wheeler Peak, San Pedro Parks, and White Mountain Wildernesses (1997 only). The median cumulative frequency SVR for the years of extant and valid photographic data are illustrated graphically in Appendix A.

The general trend at San Pedro Parks and Wheeler Peak sites may indicate visibility improvement. The change in SVR from 1986 to 1987 at San Pedro Parks cannot be readily ascribed to source emissions since all emission units (including pollution controls) of the Four Corners power plants were operating before 1986. Other unknown sources may be responsible, or more likely, the data for

1986 may not be representative because for that year it represents less than 50% of the days during the summer and fall seasons and for those seasons only. Excepting this initial year of data, the general improvement at San Pedro Parks since 1987 may be a significant finding in regard to concerns the FLMs have with possible impacts at this site from power plants in the Four Corners area. As the DOI FLM maintains, however, a few years of data may not be a long enough record to establish a visibility trend. The Forest Service is still concerned about existing visibility impairment in Northern New Mexico and believes regional haze impacts on visibility within Class I areas have been widely reported and recognized.

Visiblity in the Pecos Wilderness was monitored by the State and was discontinued in 1993. The data collected prior to discontinuing monitoring is enough to characterize the visibility at the site, and because of its proximity to the NPS site at Bandelier (approximately 30 miles) it is considered to be represented by that site.

Regional haze impacts on visibility within Class I areas have been reported. Although regional haze is not covered by Phase I, it is noted that uniform haze had been reported by the DOA FLM to occur from 80 percent to 90 percent of the time at all three photographically monitored sites. The DOI FLM reiterates 1985 findings that regional haze impairs visibility at both NPS Class I areas in New Mexico (Bandelier and Carlsbad Caverns).

The high SVR values obtained for New Mexico Class I areas indicate extremely good visibility in general; however, good visibility is more susceptible to detrimental effects than poor visibility. The same amount of added pollutant concentration reduces an SVR of 200 miles to 140 miles but only reduces an SVR of 20 miles to 19.4 miles. As stated by the DOA FLM, protection of good visibility days is a high priority.

40 CFR § 51.306(c)(4): Additional measures, including the need for SIP revisions, which may be necessary to assure reasonable progress toward the national visibility goal.

The Phase I, Part II SIP for visibility protection in New Mexico was submitted to EPA in September 1992. At that time, comments were solicited from the FLMs pertaining to implementation control strategies and the long-term strategy. The long-term strategy under the FIP is the State's and EPA's ongoing effort to implement the visibility NSR and PSD programs for prevention of future Phase I impairment (plume blight) from major stationary sources or major modifications. The State is bound by the New Mexico Air Quality Control Act to be no more stringent than the federal visibility program, but has reviewed the feasibility of SIP revisions for better assured reasonable progress toward the national visibility goal within the framework of these programs.

The FLMs submitted various recommendations in response to our request. The DOI FLM made a general suggestion, and the DOA FLM agrees, that the State take into consideration the potential indirect benefit of regional haze reduction over the long term when developing pollution prevention policies. A specific recommendation made by the DOI FLM pertained to the portion of the PSD regulations dealing with additional impacts analysis. 20 NMAC 2.74 - Prevention of Significant Deterioration is the State's PSD regulation. Section 304 of Part 74 is where provisions for the additional impacts analysis are outlined. The section requires an analysis of potential impairment to

visibility, and other items, within the area of the source or modification. This analysis is distinct from the air quality related values analysis also required under PSD.

The DOI FLM suggests that areas possessing special scenic qualities be designated important scenic resources warranting special consideration during the BACT analysis. This request was evaluated during development of the Phase I, Part II SIP and it was not found to be feasible under the current federal program. With respect to implementation control strategies, the DOI FLM recommended that means for interstate cooperation and impact consideration be established. The State considered this recommendation in its Phase I, Part II SIP development of long-term strategy and determined that the State's considerable involvement in the GCVTC and other regional air quality planning organizations was adequate.

A further suggestion by the DOI FLM was that a regional modeling assessment be done to assess cumulative source impacts on visibility in the State. As previously mentioned, the December 2, 1980 EPA guidance did not require the States to do modeling analyses. To determine cumulative source impacts on visibility within the State would require consideration of emissions entering the State from other states and Mexico and from other source types including mobile and area sources. The size and complexity of this project make it a more appropriate activity for a regional planning organization, such as the WRAP, under Phase II of the visibility program. Smaller scale modeling for individual sources and impacts from regional sources is already done as part of the permitting processes for minor sources and for PSD sources.

The DOA FLM discussed regional haze, PSD permitting procedures, integral vistas, emissions inventory, and a transport commission for the Four Corners area as items of consideration under this section of the periodic review report. Regional haze was assumed to have an important anthropogenic contribution which the FLM requested be addressed specifically in the SIP. Regional haze impacts cannot be regulated under Phase I of the visibility protection plan as previously discussed. The PSD and non-attainment permitting procedures amendments proposed by the FLM were concerned with portions of the State PSD and Non-attainment regulations not directly associated with provisions relating to the visibility program. The issues raised were primarily concerned with the desire for consideration of all FLM designated air quality related values and not just visibility. Though perhaps valid, these were considered not appropriate to the Visibility Protection Plan. It must be remembered that the federal regulations have precluded identification of integral vistas since 1985, and in New Mexico, the Air Quality Control Act requires that the State remain consistent with, and no more stringent than, the federal program.

A further suggestion by the DOA FLM was the development of an interagency smoke management agreement. The State entered into a Smoke Management MOU in 1997 and is presently working with the FLMs and potentially involved agencies in researching and developing a program consistent with our visibility goals and maintaining our PM standards.

In addition to monitoring, emission inventories are useful in determining areas influencing visibility, and in tracking trends in visibility. Emissions inventories of all industrial point sources in New Mexico have been done for 1982, 1985, 1991, 1996, 1999, and 2000. State regulation 20 NMAC 2.73 - Notice of Intent and Emission Inventory Requirements, was recently amended committing

major sources in New Mexico to report their emissions to the State on an annual basis. Additionally, the emissions inventory developed for the GCVTC (including both point and area sources), and being presently refined by the WRAP, could prove useful in this regard. And finally, the State's emissions database, AIRS Jr., is regularly updated with emissions data either through a comprehensive inventory effort or through the course of air quality permitting.

40 CFR § 51.306(c)(5): The progress achieved in implementing Best Available Retrofit Technology (BART) and meeting other schedules set forth in the long-term strategy.

The EPA determined that the incorporation of federal control strategies or emission limits representing BART into the FIP was unnecessary as no existing Phase I type impairment of visibility in the mandatory Class I federal areas was identified by the FLMs. Therefore, BART has not been implemented in New Mexico. Regarding any future BART analyses, the State will not have authority to conduct a BART review until the EPA approves the Part II SIP revision that will give New Mexico such authority.

40 CFR § 51.306(c)(6): The impact of any exemption granted under Section 303.

No existing stationary facilities in New Mexico are subject to BART requirements as explained in the previous section. Therefore, no exemptions were granted under Section 303.

40 CFR § 51.306(c)(7): The need for BART to remedy existing visibility impairment of any integral vista listed in the plan since the last such report, or in the case of the first report, since plan approval.

There have been no integral vistas listed in the plan since plan (i.e. FIP) approval in New Mexico.

40 CFR § 51.308, Regional Haze Program Requirements, and 40 CFR § 51.309, Requirements Related to the Grand Canyon Visibility Transport Commission

The difference between these two new sections to 40 CFR 51, Subpart P, Protection of Visibility, and the 1980 version of this rule, is that Sections 308 and 309 now include requirements for controlling regional haze across large geographic areas (Phase II). The earlier (Phase I) version dealt primarily with pollution from individual sources or groups of sources. States are now required to describe their intentions and their plans to deal with regional haze. Both Section 308 and 309 include the content and timeline requirements for a state SIP to be submitted to EPA. New Mexico has yet to determine whether it will file its SIP under Section 308 or 309.

This final regional haze rule requires states to consult with the FLMs on the development of the SIP.

EPA is promoting multi-state regional planning and is allowing those states that do participate in a group more time to develop their strategy. Also, the advantage to group participation is that states will be better able to determine what impact emissions from within their state have in other states and what emissions from others states might have in their own state.

SIP submittals could begin as early as December 31, 2003, and all submittals will be required no later than December 31, 2008.

The end result of submitting a SIP to EPA, either under the requirements of Section 308 or 309, are the same. The national goal is to achieve natural background visibility levels by 2064. Section 309 is an option available only to the original GCVTC states and allows those states to adopt much of the work that the GCVTC had done for its 1996 Report.

The core requirements for all SIPs under either Section 308 or 309 are;

1. list progress goals and rate of progress,
2. state the visibility conditions in the Class I areas (deciviews),
3. state the long term visibility strategy identifying measures needed to achieve progress (i.e. emission limits, compliance schedules, monitoring, source retirements, smoke management),
4. analyze and determine the rate of progress needed to achieve natural visibility by 2064,
5. list BART sources, control technologies, and schedules of compliance OR identify an emissions trading program that is more effective than BART.

Each state is required to revise and submit its SIP at regular intervals beginning July 31, 2018. These revisions must reassess the effectiveness of the state's long-term strategy and its "reasonable progress" towards achieving the national visibility goal of natural visibility levels by 2064. SIPs must be adjusted accordingly to meet the visibility goals. These reports must include the information that was used to determine that the long-term strategy is accomplishing what it was designed to do. If that information demonstrates that the strategy is inadequate the state will need to revise the SIP.

New Mexico is participating in regional haze planning being conducted by regional planning organizations (WRAP) and will likely continue to participate under Phase II of the program.

IX. Federal Land Manager Response and Comment

In comments submitted by the FLMs to our earlier periodic reports, they relayed to us a strong concern that, although presently not regulated in New Mexico, a long-term strategy should include measures to reduce regional haze impacts on Class I areas.

Under the requirements of Phase II of the Regional Haze Rule, this is a requirement of all SIPs submitted to the EPA.

The FLMs have expressed a desire for a more aggressive program for visibility improvement in New Mexico. New Mexico recognizes this concern; however, at this time New Mexico is bound by state statute not to exceed nor be more stringent than the federal visibility program. FLMs have also emphasized that although New Mexico cannot be more stringent than the federal requirements, it has also stressed that New Mexico cannot be less stringent and that New Mexico cannot make decisions over federal land management actions.

FLMs also believe that using the 90^{th} percentile, rather than the 50^{th} percentile, is more appropriate to

evaluate visibility because it sets a higher standard. FLMs have also stated that they have been given a responsibility to protect their Air Quality Related Values in Class I areas.

They have also expressed a strong desire to not only participate in the development of the upcoming SIPs, but also to make recommendations on the implementation of the SIP.

The Forest Service has submitted information which is included in Appendix C, Figure 4. Regarding the visibility data for the Gila Wilderness, the Forest states that at this time "no trends are suggested by the visibility data" and that "the process for tracking progress under the Regional Haze Rule is not finalized."

Also Forest Service submittals state that visibility values are changing somewhat due to changes in data processing algorithms from previous data and due to changes in monitoring techniques, especially with less use of camera data and by relying more on air sampling and transmissometers.

In response to their review of this 2000 visibility report, the U.S. Forest Service submitted a letter dated October 17, 2001 (see Appendix C, Figure 2) with specific comments. The Forest Service submitted visibility data and analysis which was received October 25, 2001 (see Appendix C, Figure 4).

Items of particular concern that the Forest Service wants to point out are:

1) Although New Mexico cannot be more stringent than federal requirements regarding air quality, the New Mexico also cannot be less stringent than those same federal requirements.
2) FLMs are mandated by the federal Clean Air Act to protect visibility and other air quality related values (AQRV) in Class I areas, and that thresholds which can adversely impact visibility and AQRVs are less than thresholds that can impact human health.
3) It is reasonable to believe that emissions from electric generating stations in the Four Corners area of New Mexico contribute to regional haze and visibility impairment.
4) The Albuquerque Environmental Health Department (Albuquerque/Bernalillo County) has its own regulatory authority that is equivalent to the state's authority.
5) The Wilderness Act requires that wilderness areas be protected and managed to preserve natural conditions, which includes fire.
6) The use of the 90^{th} percentile, not the 50^{th} percentile, in evaluating visibility measurements is more consistent with published guidelines in evaluation the number of clean versus hazy days. The 90^{th} percentile means that 90 out of 100 days are worse than the measured value and 10 out of 100 days are better than the measured value. The 50th percentile means that half the days are better and half the days are worse than the measured value. NMED and FLMs have disagreed on which percentile to use. This is subject to change as strategies and plans develop.
7) Sufficient data exists to demonstrate existing degradation is due to regional haze, especially in Northern New Mexico and the Gila Wilderness.
8) PSD permits are denied on the basis of impacts to Air Quality Related Values, and need to be denied if the FLM demonstrates to the satisfaction of the State that the emissions from the PSD facility will have an adverse impact on AQRVs, including visibility.

9) States are not prevented from identifying integral vistas.
10) FLMs will work with New Mexico to develop a smoke management program that meets federal regulations and draft regulations that treat all parties equally.
11) The federal regulation requiring Best Available Retrofit Technology (BART) under the regional haze rule is currently in effect.

In response to their review of this 2000 visibility report, the U.S. National Park Service and U.S. Fish and Wildlife Service submitted a letter dated November 8, 2001 (see Appendix C, Figure 2) with specific comments.

Items of particular concern to the FWS and NPS are:

1) They believe that the State's visibility protection program shows that progress is not being made in remedying visibility impairment in Class I areas and that the State's long-term strategy is not adequate to prevent future visibility impairment.
2) They believe that all Class I areas are being affected by a visibility-degrading uniform haze.
3) Their position has been that visibility impairment does exist and may be linked to power plants in the Four Corners area of New Mexico.
4) The State has not provided measures or actions to document its progress toward achieving the national visibility goals.
5) A long-term strategy by the State to achieve the national visibility goals would not have to be more stringent that the federal regulations.
6) The IMPROVE monitoring network and data collected can be used to measure the adequacy of the State's long-term strategy.
7) The PSD permitting program is not adequate to deal with impacts from existing sources and cannot prevent future visibility impairment and may be an impediment to protecting Class I areas.
8) The State's current visibility protection program will not ensure reasonable progress toward remedying existing visibility impairment or prevent future impairment.